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Short communication

Non-medical use of prescription drugs, polysubstance use, and mental health in transgender adults

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ABSTRACT

Background: In recent years, the non-medical use of prescription drugs (NMUPD) has increased dramatically and has been associated with adverse health outcomes. Prior work has not examined this behavior in large samples of transgender adults.
Methods: Transgender adults ($N = 155$) recruited from community venues in the Mid-Atlantic region completed anonymous, self-administered surveys assessing demographic information, NMUPD and other substance use, the non-medical use of hormones, psychosocial factors, and psychiatric symptoms.
Results: Overall, 26.5% of participants reported lifetime NMUPD with the most commonly reported medications used non-medically being prescription analgesics (23.9%), anxiolytics (17.4%), stimulants (13.5%), and sedatives (8.4%). Non-medical use of hormones was also frequently reported (30.3%). Participants reporting NMUPD were also more likely to report the use of illicit drugs. NMUPD, but not the non-medical use of hormones, was associated with lower self-esteem, more gender identity-based discrimination, and more self-reported symptoms of anxiety, depression, and somatic distress. Psychiatric symptoms remained statistically associated with NMUPD after controlling for demographic factors and other substance use.
Conclusions: Prescription drug misuse was relatively common in this sample and was robustly associated with emotional distress. Substance use and mental health interventions for this population may benefit from incorporating the assessment and treatment of NMUPD.
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1. Introduction

Prescription medications used for managing pain and treating anxiety, attention-deficit/hyperactivity disorder, and insomnia are increasingly being used recreationally, without a physician's prescription. Between 2004 and 2010, the number of emergency room visits attributable to pharmaceutical misuse more than doubled (SAMHSA, 2012). The misuse of prescription drugs has been linked to negative outcomes including dependence, overdose, and adverse drug interactions (SAMHSA, 2006, 2011). Common correlates of NMUPD include other substance use (Arria et al., 2008; McCabe and Teter, 2007) and mental health concerns such as depression (Zullig and Divin, 2012) and anxiety (Hall et al., 2010).

Most NMUPD studies have focused on young, heterosexual adults. A small literature examines NMUPD in sexual minority populations, primarily men who have sex with men (MSM). Kelly and Parsons (2010) reported high rates of lifetime NMUPD in MSM (49.2%) recruited from New York. A somewhat lower lifetime rate (37.7%) was reported in a sample of MSM recruited in Denver (Benotsch et al., 2011). Kecojevic and colleagues (2012) reported data from a sample of youth recruited in New York and Los Angeles who had a history of prescription drug misuse. Results showed that LGBT youth initiated misuse of opioid and tranquilizer medications at an earlier age than comparable heterosexual youth.

Prior work suggests that transgender persons have relatively high rates of both substance use (Herbst et al., 2008; Lawrence, 2008) and psychiatric symptoms (Haas et al., 2011), possibly

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due to stigmatization and gender identity-related discrimination (Nemoto et al., 2011). Prior research has reported high rates of the non-medical use of hormones in transgender populations (Crosby and Pitts, 2007) but few studies have examined the misuse of drugs typically used to treat pain or psychiatric conditions in this group. Kecojevic and colleagues (2012) reported data on NMUPD from a mixed sample of LGBT youth that included 16 transgender participants but results were not reported separately for these individuals. Our intent with this study was to examine the prevalence of NMUPD and the non-medical use of hormones in transgender persons and to assess relationships among these behaviors, other substance use, and psychiatric symptoms.

2. Methods

Participants were recruited from transgender health clinics in Richmond, VA (52.9%) and Washington, DC (16.8%), along with recruitment in bars (19.4%), at a community event (9.0%) and commercial sex work areas (1.9%). No formal attempts were made to use respondent-driven sampling or to ask participants to refer their friends. Data were collected between March 2011–August 2012. Overall, 88.7% of individuals invited to participate agreed to do so. Participants completed an anonymous, self-administered survey and were paid $10. All study procedures were approved by the relevant Institutional Review Boards.

2.1. Measures

2.1.1. Demographics. Participants were asked their age, birth gender, current gender, race/ethnicity, education, employment status and HIV status. Demographic factors have previously been associated with NMUPD (Benotsch et al., 2011; Kelly and Parsons, 2010).

2.1.2. NMUPD and non-medical use of hormones. Participants were initially asked to respond to a Yes/No question asking if they had ever used a prescription medication recreationally, without a doctor's prescription. Participants were then asked to indicate their lifetime NMUPD in four categories: analgesics (e.g., Vicodin), sedatives (e.g., Ambien), anxiolytics (e.g., Xanax), and stimulants (e.g., Adderall). Examples of medications that fall into each category were listed on the survey. This measure is similar to measures employed in prior research (Benotsch et al., 2011). A separate question asked about lifetime non-medical use of hormones.

2.1.3. Other substance use. Participants were asked questions concerning the use of alcohol, marijuana, poppers, ecstasy, cocaine, methamphetamine, heroin and "other" recreational drugs in the past 3-months. This measure is similar to measures employed in previous research (Benotsch et al., 2006).

2.1.4. Psychosocial variables. Participants completed the 18-item version of the Brief Symptom Inventory (BSI-18; Derogatis, 2001). The BSI-18 contains well-validated scales assessing symptoms of depression, anxiety, and somatic distress that occurred over the past week. A Global Severity Index can be calculated by summing the three scales. Norm data are available and scores show adequate test–retest reliability over a 2-week period (Andreu et al., 2008; Derogatis, 2001). All subscales had adequate internal consistency in this sample (alphas ranging from 0.79 to 0.92).

Participants completed a 6-item version of the Rosenberg Self-Esteem scale (Rosenberg, 1965). This is a well-validated instrument that shows considerable stability, including in sexual minority populations (Bauermeister et al., 2010). This measure had adequate internal consistency in the present sample ($\alpha = 0.79$).

Participants answered 6 questions assessing perceived discrimination due to gender identity in the past year. This measure was adapted from a prior measure used with MSM (Bogart et al., 2010) and was internally consistent in this sample ($\alpha = .70$).

3. Results

Among the 155 participants, the mean age was 31.9 years (SD = 11.6; Range = 18–65). Participants were male-to-female transgender (MTF, 67.1%) or female-to-male transgender (FTM, 32.9%) adults. The majority of the sample was African-American (50.6%), with the remainder being White (37.7%), Asian-American (2.6%), Latino (1.3%), Native-American (1.3%), or other/mixed racial heritage (6.5%). Participants reported modest educational attainment ($M = 13.0$ years, SD = 2.2) and income: 63.2% reported incomes between $0–15,000 per year with substantial numbers being unemployed (29.7%). Most participants (69.2%) were HIV-negative, 22.6% were HIV-positive, and 8.2% did not know their HIV status.

3.1. NMUPD and the non-medical use of hormones

Overall, 26.5% of the sample reported lifetime NMUPD. The most commonly used type of medication was analgesics (23.9% of the sample), followed by anxiolytics (17.4%), stimulants (13.5%), and sedatives (8.4%). A substantial minority (30.3%) also reported the non-medical use of hormones. The non-medical use of hormones did not differ significantly between individuals reporting NMUPD (32.5%) and individuals not reporting NMUPD (29.5%), χ^2 (1, $N = 152$) = 0.13, $p > .60$.

3.2. Demographic variables, NMUPD, and non-medical use of hormones

NMUPD did not differ significantly between MTF transgender participants (24.0%) and FTM transgender participants (31.4%), χ^2 (1, $N = 155$) = 0.93, $p > .30$. Individuals reporting NMUPD were significantly more likely to be HIV-positive (44.4%) than individuals not reporting NMUPD (17.3%), χ^2 (1, $N = 134$) = 9.71, $p < .01$. NMUPD was unrelated to the other demographic factors assessed.

The non-medical use of hormones was much more commonly reported by MTF transgender participants (45.8%) than by FTM transgender participants (4.3%), χ^2 (1, $N = 143$) = 30.69, $p < .001$. Individuals reporting the non-medical use of hormones were significantly more likely to be HIV-positive (38.6%) than individuals not reporting this use (16.5%), χ^2 (1, $N = 135$) = 7.69, $p < .01$. The non-medical use of hormones was unrelated to other demographic variables assessed.

3.3. NMUPD, non-medical use of hormones, and use of other drugs

Participants who reported lifetime NMUPD were significantly more likely to report recent use of recreational drugs (see Table 1). Non-medical hormone use was unrelated to the use of these substances.

3.4. NMUPD, non-medical use of hormones, and psychosocial variables

Participants who reported lifetime NMUPD reported significantly more symptoms of depression, anxiety, and somatic distress (see Table 2). On the Global Severity Index of the BSI, 37% of participants reporting NMUPD scored at or above the range indicating a probable clinical mental health concern. Participants reporting NMUPD also scored lower in self-esteem, and reported greater perceived discrimination based on gender identity in the past year. Scores on the psychosocial measures did not differ significantly between participants who did or did not report the non-medical use of hormones.

Because many factors could be associated with NMUPD, a logistic regression was conducted to determine the independent, cross-sectional relationship of psychiatric symptoms to NMUPD after accounting for other factors. This analysis showed that scores on the Global Severity Index of the BSI were associated with NMUPD (OR = 1.06, 95% CI = 1.02, 1.11, $p < .01$) after accounting for the influence of age, education, race/ethnicity, HIV status, transgender status (MTF versus FTM), and the use of alcohol, marijuana, ecstasy, cocaine, poppers, methamphetamine, and heroin. A comparable analysis found a marginally significant relationship between gender identity-based discrimination and NMUPD (OR = 1.34, 95% CI = 0.98, 1.84, $p < .10$) after accounting for these demographic and substance use variables.

Table 1
Non-medical use of prescription drugs and other substance use.

Substance use, past 3 months	Individuals reporting non-medical use of prescription drugs ($n = 41$)	Individuals NOT reporting non-medical use of prescription drugs ($n = 114$)	χ^2
	% Reporting use of	% Reporting use of	
Alcohol	72.5	70.8	0.04
Marijuana	62.5	28.1	14.71***
Poppers	15.4	3.7	5.62*
Ecstasy	20.5	6.3	5.79*
Cocaine	15.4	8.2	1.57
Methamphetamine	10.3	2.7	3.24
Heroin	10.3	1.8	4.61*
"Other" recreational drugs	20.5	3.7	9.70**

$N = 155$.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

Table 2
Non-medical use of prescription drugs and psychosocial factors.

	Individuals reporting non-medical use of prescription drugs ($n = 41$)	Individuals NOT reporting non-medical use of prescription drugs ($n = 114$)	t
	Mean (SD)	Mean (SD)	
BSI-depression	7.83 (7.67)	4.15 (5.44)	2.82**
BSI-anxiety	6.42 (6.31)	3.49 (4.84)	2.69**
BSI-somatic distress	4.50 (4.91)	2.72 (3.83)	2.10*
BSI-Global Severity Index	18.74 (17.47)	10.36 (12.96)	2.80**
Self-esteem	16.93 (3.85)	19.02 (4.30)	−2.71**
Discrimination-gender identity	2.59 (1.60)	1.89 (1.67)	2.33*

$N = 155$.
* $p < .05$.
** $p < .01$.

4. Discussion

As has been found in prior research, transgender participants who reported NMUPD were more likely to report use of other substances. It may be appropriate to consider NMUPD as part of a polysubstance use pattern. Conjoint use of medications with alcohol or other drugs can lead to multiple health problems, including respiratory failure, seizures, coma, and death (NIAAA, 2007).

This study adds to the growing literature on NMUPD and psychiatric symptoms (Zullig and Divin, 2012). Mental distress was a robust associate of NMUPD. A substantial minority of the NMUPD users in the sample reported psychiatric symptoms at a level that would merit clinical attention. Transgender adults may be more vulnerable to emotional distress because of stigma and have high suicide rates (Clements-Nolle et al., 2006; Haas et al., 2011). Although the survey specifically assessed recreational use of medications without a doctor's prescription, the non-medical use of psychiatric medications in this sample may represent an attempt to cope with emotional distress.

Transgender adults frequently report discrimination. In this study, perceptions of discrimination because of gender identity were also associated with NMUPD, but this relationship was only marginally significant in the multivariate analysis. Discrimination experiences may set the stage for emotional distress which is a more proximal correlate of NMUPD. We examined discrimination based on gender identity. Future research may benefit from examining relationships between other types of discrimination and NMUPD.

The non-medical use of hormones was common in this sample, but this behavior was not related to other substance use or psychiatric symptoms. Prior work suggests that the use of medically prescribed hormones is associated with better perceived quality of life in transgender persons (Gorin-Lazard et al., 2012) but other studies have found relationships to HIV risk behavior (Kosenko, 2011). Prior work has documented the non-medical use of hormones (Crosby and Pitts, 2007) but this is one of the first studies to examine relationships between this behavior and HIV status, substance use, and psychiatric symptoms. More research on the non-medical use of hormones in transgender adults is needed.

These data were collected from a convenience sample of transgender adults recruited in community settings in the Mid-Atlantic region; generalization to other regions and populations may not be warranted. In addition, the surveys relied on self-reported behavior, potentially leading respondents to over or under-report risk behaviors. We asked about the use of broad classes of medication (e.g., analgesics) but did not separately assess the use of specific medications (e.g., Vicodin). To provide a more fine-grained understanding of the NMUPD of transgender adults, future work should ask about the non-medical use of specific medications within each class. We also assessed lifetime NMUPD; future work should also assess recent NMUPD. Despite these limitations, this is the first study to document prevalence rates and correlates of NMUPD in transgender adults. Interventions directed at this group may benefit from assessing and treating NMUPD.

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Contributors

Eric Benotsch, Rick Zimmerman, Laurie Cathers, Shawn McNulty, Juan Pierce and Ted Heck planned the study and collected the data. Eric Benotsch completed the data analyses. All authors contributed to the writing of the manuscript and approved the final version of the manuscript.

Conflict of interest

The authors have no conflicts of interest to report.

References

Andreu, Y., Galdón, M.J., Dura, E., Ferrando, M., Murgui, S., García, A., Ibáñez, E., 2008. Psychometric properties of the Brief Symptom Inventory-18 (BSI-18) in a Spanish sample of outpatients with psychiatric disorders. Psichothema 20, 844–850.

Arria, A.M., Caldeira, K.M., O'Grady, K.E., Vincent, K.B., Johnson, E.P., Wish, E.D., 2008. Nonmedical use of prescription stimulants among college students: associations with attention-deficit-hyperactivity disorder and polydrug use. Pharmacotherapy 28, 156–169.

Bauermeister, J.A., Johns, M.M., Sandfort, T.G.M., Eisenberg, A., Grossman, A.H., D'Augelli, A.R., 2010. Relationship trajectories and psychological well-being among sexual minority youth. J. Youth Adolesc. 39, 1148–1163.

Benotsch, E.G., Seeley, S., Mikytuck, J., Pinkerton, S.D., Nettles, C.D., Ragsdale, K., 2006. Substance use, medications for sexual facilitation, and sexual risk behavior among traveling men who have sex with men. Sex. Transm. Dis. 33, 706–711.

Benotsch, E.G., Martin, A., Koester, S., Cejka, A., Luckman, D., 2011. Non-medical use of prescription drugs and HIV risk behavior in gay and bisexual men. Sex. Transm. Dis. 38, 105–110.

Bogart, L.M., Wagner, G.J., Galvan, F.H., 2010. Longitudinal relationships between antiretroviral treatment adherence and discrimination due to HIV-serostatus, race, and sexual orientation among African American men with HIV. Ann. Behav. Med. 40, 184–190.

Clements-Nolle, K., Marx, R., Katz, M., 2006. Attempted suicide among transgender persons: the influence of gender-based discrimination and victimization. J. Homosex. 51, 53–69.

Crosby, R.A., Pitts, N.L., 2007. Caught between different worlds: how transgendered women may be "forced" into risky sex. J. Sex Res. 44, 43–48.

Derogatis, L.R., 2001. Brief Symptom Inventory 18, Administration and Scoring Manual. Pearson, San Antonio, TX.

Gorin-Lazard, A., Baumstarck, K., Boyer, L., Maquigneau, A., Geleux, St., Penochet, J.C., Pringuey, D., Albarel, F., Morange, I., Loundou, A., Berbis, J., Auquier, P., Lancon, C., Bonierbale, M., 2012. Is hormonal therapy associated with better quality of life in transsexuals? A cross-sectional study. J. Sex. Med. 9, 531–541.

Haas, A.P., Eliason, M., Mays, V.M., Mathy, R.M., Cochran, S.D., D'Augelli, A.R., Silverman, M.M., Fisher, P.W., Hughes, T., Rosario, M., Russell, S.T., Malley, E., Reed, J., Litts, D.A., Haller, E., Sell, R.L., Remafedi, G., Bradford, J., Beautrais, A.L., Brown, G.K., Diamond, G.M., Friedman, M.S., Garofalo, R., Turner, M.S., Hollibaugh, A., Clayton, P.J., 2011. Suicide and suicide risk in lesbian, gay, bisexual, and transgender populations: review and recommendations. J. Homosex. 58, 10–51.

Hall, M.T., Howard, M.O., McCabe, S.E., 2010. Subtypes of adolescent sedative/anxiolytic misusers: a latent profile analysis. Addict. Behav. 35, 882–889.

Herbst, J.H., Jacobs, E.D., Finlayson, T.J., McKleroy, V.S., Spink Neumann, M., 2008. Estimating HIV prevalence and risk behaviors of transgender persons in the United States: a systematic review. AIDS Behav. 12, 1–17.

Kecojevic, A., Wong, C.F., Shrager, S.M., Silva, K., Jackson Bloom, J., Iverson, E., Lankenau, S.E., 2012. Initiation into prescription drug misuse: differences between lesbian, gay, bisexual, transgender (LGBT) and heterosexual high-risk young adults in Los Angeles and New York. Addict. Behav. 37, 1289–1293.

Kelly, B.C., Parsons, J.T., 2010. Prevalence and predictors of non-medical prescription drug use among men who have sex with men. Addict. Behav. 35, 312–317.

Kosenko, K.A., 2011. Contextual influences on sexual risk-taking in the transgender community. J. Sex Res. 48, 285–296.

Lawrence, A.A., 2008. Gender identity disorders in adults: diagnosis and treatment. In: Rowland, D.L., Incrocci, L. (Eds.), Handbook of Sexual and Gender Identity Disorders. Wiley, New York, pp. 423–456.

McCabe, S.E., Teter, C.J., 2007. Drug use related problems among nonmedical users of prescription stimulants: a web-based survey of college students from a Midwestern university. Drug Alcohol Depend. 91, 69–76.

Nemoto, T., Bodeker, B., Iwamoto, M., 2011. Social support, exposure to violence and transphobia, and correlates of depression among male-to-female transgender women with a history of sex work. Am. J. Public Health 101, 1980–1988.

National Institute on Alcohol Abuse and Alcoholism, 2007. Harmful Interactions: Mixing Alcohol with Medicines. NIH Publication No. 03-5329. Retrieved from: http://pubs.niaaa.nih.gov/publications/medicine/medicine.htm (12.10.2012).

Rosenberg, M., 1965. Society and the Adolescent Self-Image. Princeton University Press, Princeton, NJ.

Substance Abuse and Mental Health Services Administration, 2006. Prescription medications: misuse, abuse, dependence and addiction. Substance Abuse Treatment Advisory. 5, Rockville, MD.

Substance Abuse and Mental Health Services Administration, 2011. Results from the 2010 National Survey on Drug Use and Health: summary of national findings, NSDUH Series H-41, HHS Publication No. (SMA) 11-4658. Rockville, MD.

Substance Abuse and Mental Health Services Administration, 2012. Highlights of the 2010 drug abuse warning network (dawn) findings on drug-related emergency department visits. Rockville, MD. Retrieved from: http://www.samhsa.gov/data/2k12/DAWN096/SR096EDHighlights2010.htm (17.1.2013).

Zullig, K.J., Divin, A.L., 2012. The association between non-medical prescription drug use, depressive symptoms, and suicidality among college students. Addict. Behav. 37, 890–899.